Field Performance of Forty Soybean Varieties in a Southern Root-knot Nematode Infested Field, 2020

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The southern root-knot nematode (*Meloidogyne incognita*) is the most important yield-limiting plant-pathogenic nematode that affects soybean production in the mid-South. It is found in nearly all soybean producing counties in Arkansas and can cause significant (>70%) yield loss when the wrong soybean variety (i.e. susceptible) is planted in field with a high population density of root-knot nematodes. During the 2020 season, the Lonoke Extension Plant Pathology Program selected 40 soybean varieties that were divided into 5 experiments based on herbicide technologies and maturity groups. Varieties were planted in a randomized complete block design with four replications into a loamy to sandy loam soil near Lonoke, Arkansas. Plots were planted at a seeding rate of 150,000 seeds per acre following corn. Eight root systems were sampled from each plot to determine percent root galling at the R5-R6 growth stage. The final nematode population densities (Pf) collected at harvest ranged from 290 - 719 second-stage root-knot nematode juveniles (J2)/100 cm^3 soil, which would be a moderate to severe threshold in Arkansas. The Pf counts are considerably higher than in 2017 because most of plants didn't mature early thus the peak nematode population occurred when samples were collected at harvest. Percent of root system galled was estimated for at least 8 root systems from each replication per test at R4-R5 growth stage. In general, soybean varieties in each category with the lowest gall rating contributed to the greatest yield; however, there were a few tolerant varieties that had high galling and good yield (Table 1-5). Soybean varieties with <4% of root of system galled are considered resistant compared to those with the greatest galling percentage. For example, 'GoSoy 49G16' is resistant compared to 'Delta Grow DG4880' (2.8/36.8). Field performance of soybean varieties from previous trials (2016, 2017, and 2018) can be found on this website or on the UA Research Series website. These results and those on the UA variety testing website can be helpful for variety selection for the 2021 cropping season.

Table 1. Field performance of 11 Roundup Ready, Enlist, and Xtend MG IV soybean varieties in a southern root-knot nematode infested field. Soil texture was a sandy loam soil (56% sand, 47% silt, and 64% clay). (Pf = 458 J2/100cm^3 of soil).

Variety	Percent root system galled[a]	Yield (bu/A)
GT Ireane	5.3 bc	62.6 a
GoSoy 49G16	2.8 c	60.8 ab
Pioneer P43A42X-SA2P	5.5 abc	60.6 ab
Pioneer P49T62E-SA2P	32.0 a	57.5 abc
Credenz CZ 4810X	8.5 abc	56.1 a-d
Dyna Gro S48XT40	8.5 abc	55.8 a-d
Progeny P4908 E3S	6.8 abc	53.1 a-d
Delta Grow DG4880RR	36.8 a	47.5 bcd
Armor 44-D19	29.5 ab	45.8 cd
Armor 48-D03	39.0 a	43.2 d

[a] Data are averages of four replications and averages followed by a different letter within each column are significantly different at $\alpha = 0.05$ according to Tukey's HSD.

Table 2. Field performance of 11 Roundup Ready, Enlist, and Xtend MG IV soybean varieties in a southern root-knot nematode infested field. Soil texture was a sandy loam soil (50% sand, 47% silt, and 2.7% clay). (Pf = 387 J2/100cm^3 of soil).

Variety	Percent root system galled[a]	Yield (bu/A)
Delta Grow DG48E28	12.0 ab	56.1 a
Pioneer P46A35X	9.0 ab	55.8 a
Delta Grow DG4940	4.50 b	54.5 ab
Progeny P4444 RXS	13.8 ab	53.9 ab
Pioneer P48A60X	27.0 ab	49.8 abc
NK S45-J3X	20.0 ab	49.5 abc
Pioneer P41T07E-SA2P	28.80 ab	47.9 abc
Pioneer P39T73E-SA2P	33.0 a	45.8 abc
Pioneer P48T22-SA2P	31.3 a	38.3 abc
Delta Grow DG4880RR	45.0 a	37.5 bc
USG 7461XTS	33.8 a	35.9 c

[a] Data are averages of four replications and averages followed by a different letter within each column are significantly different at $\alpha = 0.05$ according to Tukey's HSD.

Table 3. Field performance of 11 Roundup Ready, Enlist, and Xtend MG V soybean varieties in a southern root-knot nematode infested field. Soil texture was a loam soil (53% sand, 37% silt, and 10% clay). (Pf = 290 J2/100cm^3 of soil).

Variety	Percent root system galled[a]	Yield (bu/A)
GoSoy 50G17	3.8 d	60.7 a
Pioneer P52A05X	3.5 d	60.6 a
Armor 55-D57	3.0d	54.8 ab
Progeny P5554 RX	6.3 a-d	52.1 abc
Credenz CZ 5700X	4.8 bcd	50.3 abc
GoSoy 5214	1.5 d	49.1 abc
Delta Grow DG50E10	4.0 cd	47.7 a-d
Local Seed LS5009XS	35.5 abc	44.4 bcd
Delta Grow DG5170	33.8 ab	44.2 bcd
Progeny P5016 RXS	41.3 a	40.3 cd
NK S52-47X	31.3 ab	34.2 d

[a] Data are averages of four replications and averages followed by a different letter within each column are significantly different at $\alpha = 0.05$ according to Tukey's HSD.

Table 4. Field performance of 3 Liberty Link MG IV soybean varieties in a southern root-knot nematode infested field. Soil texture was a sandy loam soil (48% sand, 51% silt, and .60 clay). (Pf = 335 J2/100cm^3 of soil).

Variety	Percent root system galled[a]	Yield (bu/A)
Pioneer P45A29L-SA2P	4.5 b	63.8 a
Credenz CZ 4649LL (Susc. Check)	17.5 ab	51.4 b
Pioneer P38A49L-SA2P	25.0 a	40.3 c

[a] Data are averages of four replications and averages followed by a different letter within each column are significantly different at $\alpha = 0.05$ according to Tukey's HSD.

Table 5. Field performance of 4 Liberty Link MG V soybean varieties in a southern root-knot nematode infested field. Soil texture was a sandy loam soil (65% sand, 28% silt, and 7.4% clay). (Pf = 719 J2/100cm^3 of soil).

Cultivar	Percent root system galled[a]	Yield (bu/A)
Pioneer P52A43L-SA7P	8.3 b	65.4 a
Progeny P5414 LLS	38.8 ab	42.2 b
Credenz CZ 5150LL (Trt. Susc)	67.5 a	38.0 b
Credenz CZ 5150LL (Susc. Check)	63.8 a	37.3 b

[a] Data are averages of four replications and averages followed by a different letter within each column are significantly different at $\alpha = 0.05$ according to Tukey's HSD.

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